

Wyoming Judicial Retirement System

Actuarial Valuation Report
for the Year Beginning January 1, 2020





May 29, 2020

Board of Trustees
Wyoming Judicial Retirement System
6101 Yellowstone Road
Suite 500
Cheyenne, WY 82002

Dear Board of Trustees:

Subject: Actuarial Valuation as of January 1, 2020

We are pleased to present the report of the actuarial valuation of the Wyoming Judicial Retirement System ("the Fund") for the plan year commencing January 1, 2020. This report describes the current actuarial condition of the Fund, determines the calculated employer contribution rate (the actuarially determined contribution rate), and analyzes changes in this contribution rate from the prior year. Valuations are prepared annually, as of January 1, the first day of the Fund's plan year.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

Financing Objectives and Funding Policy

The employer and employee contribution rates are specified in the statute. The purpose of this actuarial valuation is to determine whether or not this statutory contribution is sufficient to meet the obligations of the Fund. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different.

This valuation assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

Progress toward realization of financing objectives

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) is a standard measure of a plan's funded status. The funded ratio as of January 1, 2020 is 95.08%. This funded ratio is based on the assumption that no future cost-of-living increases will be paid. In the January 1, 2019 valuation, this funded ratio was 97.66%. On a market value of assets basis, the funded ratio increased from 91.25% as of January 1, 2019, to 98.95% as of January 1, 2020. The funded status alone is not appropriate for assessing the need for future contributions. The funded status is also not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

Benefit Provisions

The benefit provisions reflected in this valuation are those, which were in effect on January 1, 2020. W.S. 9-3-454 prohibits benefit changes, including cost-of-living increases, unless the funded ratio stays above 100% plus a margin for adverse experience throughout the life of the benefit change. Therefore, this valuation does not include any liability for future cost increases. There were no benefit changes since the prior valuation.

The benefit provisions are summarized in Appendix B of the report.

Assumptions and Methods

Actuarial assumptions and methods are set by the Board, based upon recommendations made by the plan's actuary. The current assumptions used in the actuarial valuation were adopted by the Board effective August 23, 2017 and were first utilized with the January 1, 2018 valuation report. For a detailed description of the experience related to these assumptions, as well as the rationale for any changes, please see our latest Wyoming Retirement System Actuarial Experience Study Report. Our experience study report was dated January 10, 2018 and it covered the five-year investigation period ending December 31, 2016. All actuarial assumptions used in this report are reasonable for the purposes of this valuation.

The results of the actuarial valuation are dependent upon the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. The actuarial calculations presented in the report are intended to provide information for rational decision making.

The 9.22% employee contribution and the 14.50% employer contribution are the rates that comply with State law. Due to the many factors affecting a retirement system, users of this report should be aware that contributions made at that rate do not necessarily guarantee long-term benefit security.



Assumptions and Methods (continued)

The employer contribution requirement in Table 1 of this report is determined using the actuarial assumptions and methods disclosed in Appendix A of this report. This report does not include a detailed assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the plan's financial condition.

All assumptions and methods are described in Appendix A of the report.

Data

Member data for retired, active, and inactive members was supplied as of January 1, 2020 by the Fund's staff. We did not audit this data, but we did apply a number of tests to the data, and we concluded that it was reasonable and consistent with the prior year's data.

Asset and financial information as of January 1, 2020 was prepared by Wyoming Retirement System and is the responsibility of management. Eide Bailly, LLP provided us the asset and financial information and will opine on Wyoming Retirement System's statements.

We are not responsible for the accuracy or completeness of the information provided by the System's staff.

Plan Experience

As part of each valuation, we examine the Fund's experience relative to the assumptions. As experience in a given year deviates from the assumptions, a gain occurs if the liabilities grow slower than the assumption set anticipates and a loss occurs if the liabilities grow faster. Overall, the Fund had a total experience loss of \$970,780 including an investment loss of \$230,973, a contribution gain of \$485,202 and a liability loss of \$1,225,009. The aggregate results of these analyses are disclosed in Tables 4 and 5 under Section III of the report.

Actuarial Certification

All of the tables contained in this actuarial valuation report were prepared by Gabriel, Roeder, Smith & Company. Historical information for years prior to 2010 was prepared by the prior actuarial firm and was not subjected to our actuarial review.

We certify that the information presented herein is accurate and fairly portrays the actuarial position of the Fund as of January 1, 2020.

All of our work conforms with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of state law and, where applicable, the Internal Revenue Code and ERISA.

The undersigned are independent actuaries and consultants. Mark Randall and Thomas Lyle are Enrolled Actuaries and Mark Randall, Paul Wood, and Thomas Lyle are Members of the American Academy of Actuaries, and all three meet all the Qualification Standards of the American Academy of Actuaries.

Finally, all of the undersigned are experienced in performing valuations for large public retirement systems.

Respectfully submitted,

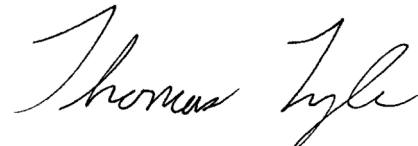
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SECTION I

EXECUTIVE SUMMARY

Executive Summary

Item	January 1, 2020	January 1, 2019
	No COLA	No COLA
1. Contributions:		
a. Total normal cost	22.23%	22.28%
b. Employee contributions	(9.22%)	(9.22%)
c. Net employer normal cost	13.01%	13.06%
d. Amortization payment	1.87%	0.89%
e. Administrative expenses	0.38%	0.42%
f. Required contribution	15.26%	14.37%
g. Statutory	(14.50%)	(14.50%)
h. Shortfall/(surplus)	0.76%	(0.13%)
2. Funding Elements:		
a. Market value of assets (MVA)	\$33,911,571	\$28,348,072
b. Actuarial value of assets (AVA)	\$32,585,154	\$30,341,215
c. Actuarial accrued liability (AAL)	\$34,270,621	\$31,067,933
d. Unfunded/(overfunded) actuarial accrued liability	\$1,685,467	\$726,718
3. Contributions and Ratios:		
a. Annual required contribution	\$1,176,110	\$986,724
b. Actual contributions	N/A	1,060,477
i. Employer	N/A	1,060,445
ii. Other	N/A	32
c. Percentage contributed	N/A	107.47%
d. Funded ratio on an actuarial basis (AVA/AAL)	95.08%	97.66%
e. Funded ratio on a market basis (MVA/AAL)	98.95%	91.25%
f. Covered payroll	\$7,706,958	\$6,866,395

SECTION II

DISCUSSION

Contribution Requirements

- Exhibits throughout this report are based primarily, unless stated otherwise, on the assumption of no future cost-of-living adjustments (COLAs).
- W.S. 9-3-454 prohibits benefit changes, including cost-of-living increases, unless the funded ratio stays above 100% plus a margin for adverse experience throughout the life of the benefit change. The actuarial value funded ratio is 95.08% and the market value funded ratio is 98.95%.
- The actuarial assumptions have not been updated since the prior valuation. For a detailed description of the experience related to these assumptions, as well as the rationale for any changes, please see our latest Wyoming Retirement System Actuarial Experience Study Report.
- The amortization payment is based upon the following assumptions:
 - The funding period is based on a 15-year closed period for the initial base as of January 1, 2018 and 15-year closed period layers for future gains and losses
 - Contribution amounts are calculated in such a way that they will increase as a level percentage of payroll
 - Total payroll increases are assumed at 4.00% per year
 - Future growth in the number of active members is not reflected in the annual valuation
- Analysis of the change in contribution rates is shown in Table 5 under Section III of the report.
- At the time this report is being issued, we are living through the global COVID-19 pandemic. As a result, the financial markets are significantly down and experiencing extreme volatility. A discussion of possible impacts of the pandemic will be provided outside of this report.

Calculation of Contribution Rates

The funds available to pay benefits come from two sources, contributions and investment income on those contributions (the majority of the funds available to pay benefits typically come from investment income). The Fund receives contributions from two sources, employer contributions and member contributions, both of which are determined as a percentage of pay. As shown in Table 1 under Section III of the report, the employer contribution rate has three components:

- The normal cost percentage (NC%)
- The amortization percentage (UAAL%)
- The administrative expenses

The NC% is the theoretical amount which would be required to pay the members' benefits if this amount had been contributed from each member's entry date and if the fund's experience exactly followed the actuarial assumptions. The NC% is shown in Table 3 under Section III of the report.

Members are required to make employee contributions and only the excess of the NC% over the member contribution rate is included in the employer contribution rate.

The actuarial accrued liability (AAL) is the difference between (i) the actuarial present value of all future benefits for all current participants of the fund, including active, inactive and retired members, and (ii) the actuarial present value of future normal costs. Thus, the AAL represents the liability associated with past years. The unfunded actuarial accrued liability (UAAL) is the difference between the AAL and the actuarial value of assets (AVA). It is the shortfall/excess between the liability associated with prior years (the AAL) and the assets actually accumulated (the AVA). This shortfall/excess can arise from several sources, including actuarial gains and losses which are caused by differences between actual experience and the plan's assumptions, changes to the plan's actuarial assumptions, and amendments to the benefit provisions.

The UAAL% is the amount required to fund this difference. It is the amount, expressed as a level percentage of payroll, necessary to amortize the UAAL. Amortization bases are established each year and amortized based on the Board's policy. The Board's policy consists of amortizing the unfunded liability as of January 1, 2018, over a closed 15 year period with each subsequent amortization base created as a result of year to year experience changes over individual 15 year closed periods. The Executive Summary shows the UAAL%, called Amortization Payment, compared to that of last year.

Administrative expenses are the average of the actual expenses for the prior two years, with each year projected at 2.50% to the valuation date.

The calculated rate is used in determining the contributions necessary to meet the Actuarially Determined Contribution for the twelve-month period beginning January 1, 2020. Note, however, that the employer contribution is set at 14.50% of payroll. As of January 1, 2020, the employer contribution is within 0.76% of meeting the Actuarially Determined Contribution. The current shortfall in contribution is expected to persist in the short term.

Financial Data and Experience

As of January 1, 2020, the Fund has a total market value of \$33.9 million. Financial information was received from Eide Bailly, LLP.

Table 7 under Section III of the report shows a reconciliation of the market values between the beginning and end of 2019.

During 2019, the total investment return on the market value of assets (MVA) was 18.72%, as reported by Meketa Investment Group, Inc, as shown in Table 10 under Section III of the report.

In determining the contribution rates and funded status of the Fund, an actuarial value of assets (AVA) is used rather than the market value of assets. The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (or less than) expected investment income. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of administrative and investment expenses. An adjustment is made if the actuarial value is not within 20% of the Market Value. For any year following a year in which the 20% of market value adjustment was applied, the actuarial value is determined as if the adjustment was not applied in the previous year.

The development of the AVA is shown in Table 9 under Section III of the report. The AVA is \$32.6 million. The AVA is 96.09% of the MVA as of December 31, 2019, compared to 107.03% last year. The difference between the AVA and the MVA is deferred gains and losses. As of January 1, 2019, the total deferred loss was \$1,993,143. As of January 1, 2020, the total deferred gain was \$1,326,417.

In addition to the market return, Table 10 also shows the return on the actuarial value of assets for the Fund. For 2019, this return was 6.24%. Because this is less than the assumed 7.00% investment return for the prior year, an actuarial loss occurred increasing the unfunded actuarial accrued liabilities of the fund by \$0.2 million.

Member Data

Member data as of January 1, 2020 was supplied electronically by the Fund's staff. While we did not audit this data, we did perform various tests to ensure that it was internally consistent, consistent with the prior year's data, and was reasonable overall.

Table 15 under Section III of the report shows the number of members by category (active, inactive, retired, etc.) along with member statistics. Tables 16 through 23 show summaries of certain historical data and include membership statistics.

Total active member projected payroll increased 12.24% last year, compared with a 0.68% increase the prior year.

The average of the final average salaries for participants who retired or became disabled this year is \$136,443.

The change in payroll is significant because the methodology used in the valuation to amortize the unfunded actuarial accrued liability assumes a growing payroll into the future. If the payroll does not grow at the assumed 4.00% per year average, then the current amortization payments may be understated and the funding position of the Fund will not strengthen as assumed over time. Higher than expected payroll growth, however, has the opposite effect and the funded position of the Fund should trend upward. Table 5 under Section III of the report shows, for the past year, payroll for the plan increased more than expected.

Of the 50 active participants, 13 are eligible or will become eligible for normal retirement in 2020, and 14 are eligible or will become eligible for early retirement in 2020.

Benefit Provisions

Appendix B of the report includes a more detailed summary of the benefit provisions for the Fund. A brief summary is as follows:

- *Normal Retirement Eligibility*
 - Age 70, age 65 with four or more years of service, or age 60 with 20 or more years of service.
- *Normal Retirement Benefit*
 - One-twelfth of the Final Average Salary times the sum of the following:
 - a) 4% for each of the first five years of service,
 - b) 3% for each year from and including the sixth year through the fifteenth year of service,
 - c) 2% for each year from and including the sixteenth year through the twentieth year of service,
 - d) 1% for each year thereafter.
- *Early Retirement Eligibility and Benefit*
 - Age 55 with four or more years of service. Normal retirement benefit reduced five percent for each year of retirement prior to age 65.
- *Normal Form of Payment* is a monthly benefit for life. Upon death, 50% of the benefit continues to be paid to the beneficiary.
- *Employee Contributions* are required
 - 9.22% of pay.
- *Post-retirement Cost-of-Living Adjustments (COLAs)*
 - W.S. 9-3-454 prohibits benefit changes, including cost-of-living increases, unless the funded ratio stays above 100% plus a margin for adverse experience throughout the life of the benefit change.

There have been no changes to plan provisions since the prior valuation.

Actuarial Methods and Assumptions

Appendix A of the report includes a summary of the actuarial assumptions and methods used in this valuation. A few highlights are listed as follows:

- Costs are determined using the Entry Age Normal actuarial cost method, calculated as a level percentage of payroll.
- The unfunded actuarial accrued liability is amortized over an effective 15 year closed period as a level percent of payroll. Future valuations will include additional amortization layers on a closed 15 year bases.
- The assumed annual investment return rate is 7.00%, with assumed inflation of 2.25%.
- Payroll is assumed to increase at 4.00% per year.
- Inactive vested participants are assumed to retire at age 65 or on the valuation date if over age 65.
- No benefit data is available for members entitled to deferred benefits. The present value of benefits expected to be paid to vested inactive non-retired members is approximated using the data provided.

The average future lifetime for current pensioners is 14.3 years.

The actuarial assumptions and methods were reviewed in detail as part of the 2017 Experience Study covering the five year period ending December 31, 2016. Please see Appendix A for a summary of the assumptions.

GASB and Funding Progress

Governmental Accounting Standards Board Statement Number 67 (GASB 67) contains certain accounting requirements for the Fund. Schedules, notes and required supplementary information are provided under separate cover.

SECTION III

SUPPORTING EXHIBITS

Table 1A

Calculation of Employer Contribution Rate

(Assumes No Future Cost-Of-Living Increases)

Item	January 1, 2020	January 1, 2019
1. Projected valuation payroll	\$7,706,958	\$6,866,395
2. Present value of future pay	\$66,838,157	\$56,481,836
3. Employer normal cost rate	13.01%	13.06%
4. Actuarial accrued liability for active members		
a. Present value of future benefits for active members	\$29,890,620	\$27,363,264
b. Less: present value of future employer normal costs	(7,909,970)	(6,776,887)
c. Less: present value of future employee contributions	(6,162,478)	(5,207,625)
d. Actuarial accrued liability	\$15,818,172	\$15,378,752
5. Total actuarial accrued liability for:		
a. Retirees and beneficiaries	\$18,452,449	\$15,689,181
b. Disabled members	0	0
c. Inactive members	0	0
d. Active members (Item 4d)	15,818,172	15,378,752
e. Total	\$34,270,621	\$31,067,933
6. Actuarial value of assets (Table 9)	\$32,585,154	\$30,341,215
7. Unfunded actuarial accrued liability (UAAL) (Item 5e - Item 6)	\$1,685,467	\$726,718
8. Effective UAAL amortization period	15 years	15 years
9. Assumed payroll growth rate	4.00%	4.00%
10. Employer Contribution requirement		
a. UAAL amortization payment as % of pay	1.87%	0.89%
b. Employer normal cost	13.01%	13.06%
c. Administrative expense	0.38%	0.42%
d. Contribution requirement (a + b + c)	15.26%	14.37%

Table 1B

Calculation of UAAL Amortization Payment

(Assumes No Future Cost-Of-Living Increases)

UAAL as of January 1, 2020		\$1,685,467		
Total Prior Remaining Amortization Bases as of January 1, 2020		\$714,688		
2020 Amortization Base as of January 1, 2020		\$970,779		
2020 Payment (15 years, level percent of pay amortization)		\$81,078		
		As of January 1, 2020		
Base Year	Initial Base	Remaining Base	Years Remaining	Amortization Payment
2020	\$ 970,779	\$ 970,779	15	\$ 81,078
2019	702,806	691,286	14	61,045
2018	24,311	23,402	13	2,196
Total		\$ 1,685,467		\$ 144,319

Table 2
Cost Breakdown
(Assumes No Future Cost-Of-Living Increases)

Item	Present Value of Future Normal Costs (1)	Actuarial Accrued Liabilities (2)	Total Present Value of Benefits (3) = (1) + (2)
Age and service allowances based on total service and disability benefits likely to be rendered by present active members	\$13,256,634	\$15,151,555	\$28,408,189
Death-in-service benefits likely to be paid on behalf of present active members (employer financed portion)	605,360	661,055	1,266,415
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active members	210,454	5,562	216,016
Benefits likely to be paid to vested inactive members	0	0	0
Benefits to be paid to members due refunds	0	0	0
Benefits to be paid to current retirees, disabled members, beneficiaries, and future beneficiaries of current retirees	0	18,452,449	18,452,449
Total	\$14,072,448	\$34,270,621	\$48,343,069
Actuarial value of assets	0	32,585,154	32,585,154
Liabilities to be covered by future contributions	\$14,072,448	1,685,467	\$15,757,915

Table 3

History of Total Normal Cost

(Assumes No Future Cost-Of-Living Increases)

Fiscal Year Ending December 31	Total Normal Cost as Percent of Payroll
2007	15.24%
2008	14.76%
2009	18.45%
2010	19.05%
2011	18.88%
2012	18.94%
2013	19.03%
2014	19.10%
2015	19.14%
2016	19.07%
2017	19.06%
2018	22.14%
2019	22.28%
2020	22.23%

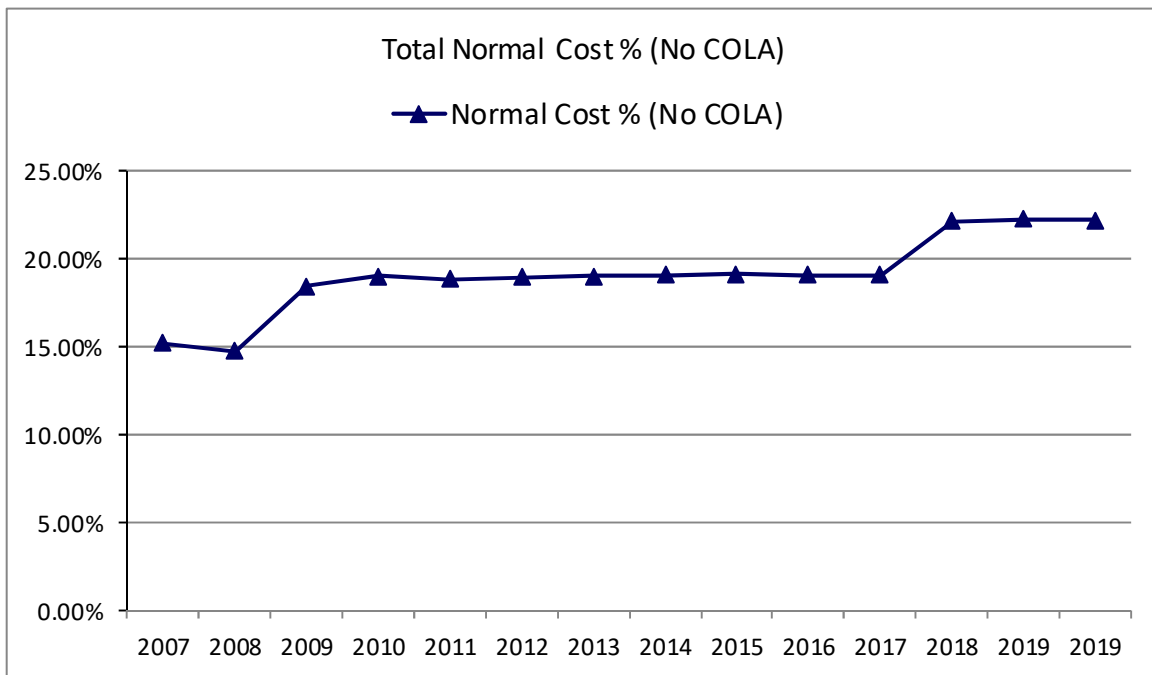


Table 4
Calculation of Total Actuarial Gain/(Loss)
(Assumes No Future Cost-Of-Living Increases)

Item	January 1, 2020
1. Derivation of Experience Gain/(Loss)	
a. Unfunded actuarial accrued liability (UAAL) - previous valuation	\$726,718
b. Normal cost (NC) for fiscal year ending December 31, 2019	1,529,896
c. Expected administrative expenses for fiscal year ending December 31, 2019	29,100
d. Actuarially determined contribution for fiscal year ending December 31, 2019	1,619,805
e. Interest accrual:	
(i) For whole year on (a)	50,870
(ii) For half year on (b) + (c) - (d)	(2,092)
(iii) Total interest: (e)(i) + (e)(ii)	48,778
f. Change in UAAL due to plan changes	-
g. Change in UAAL due to assumption change	-
h. Expected UAAL current year: (a) + (b) + (c) - (d) + (e)(iii) + (f) + (g)	714,687
i. Actual UAAL current year	1,685,467
j. Experience gain/(loss): (h) - (i)	(970,780)
k. Experience gain/(loss) as a % of actuarial accrued liability	-2.83%
2. Approximate Portion of Gain/(Loss) Due to Investments (at Actuarial Value)	(\$230,973)
3. Approximate Portion of Gain/(Loss) Due to Contributions higher or lower than expected*	\$485,202
4. Approximate Portion of Gain/(Loss) Due to Liabilities: (1)(j) - (2) - (3)	(\$1,225,009)
a. Age & service retirements	(245,074)
b. Disability retirements	806
c. Death-in-service	10,690
d. Withdrawal from employment	(20,757)
e. Rehires and new hires	(141,954)
f. Pay increases	(155,838)
g. Death after retirement	(201,212)
h. Service Purchases	(353,862)
i. Other	(117,808)
j. Other as a % of actuarial accrued liability	-0.34%

*Includes \$354 thousand in additional employee contributions for service purchases. These additional contributions offset the liability loss due to service purchases.

Table 5**Change in Calculated Contribution Rate Since the Prior Valuation
(Assumes No Future Cost-Of-Living Increases)**

Item	January 1, 2020
1. Calculated contribution rate as of January 1, 2019	14.37%
2. Change in contribution rate during year	
a. Change in employer normal cost	-0.05%
b. Assumption changes	0.00%
c. Actuarial (gain) loss from investments on actuarial value of assets	0.27%
d. Actuarial (gain) loss from liability sources and administrative expenses	1.39%
e. Difference between contributions made and required contributions	-0.57%
f. Effect of payroll growing (slower)/faster than assumption	-0.15%
h. Other changes	0.00%
i. Total change	0.89%
3. Calculated contribution rate as of January 1, 2020	15.26%

Table 6
Statement of Plan Net Assets

Assets at Market Value		
Item	FYE 2019	FYE 2018
1. Cash and Cash Equivalents (Operating Cash)	\$1,939,542	\$2,435,204
2. Receivables		
a. Insurance premium tax	\$0	\$0
b. Buy backs	0	0
c. Employer contributions	0	38
d. Employee contributions	0	110
e. Securities sold	120,631	206,198
f. Accrued interest and dividends	74,878	74,398
g. Currency contract receivable	749,611	6,158,564
h. Other	0	0
i. Rebate and fee income receivable	0	0
j. Total receivables	\$945,120	\$6,439,308
3. Investments, at Fair Value	\$33,549,800	\$27,948,143
4. Liabilities		
a. Benefits and refunds payable	\$0	\$0
b. Securities purchased	(161,436)	(441,560)
c. Administrative and consulting fees payable	(112,487)	(79,067)
d. Currency contract payable	(753,253)	(6,179,429)
e. Securities lending collateral	(1,495,715)	(1,774,527)
f. Total liabilities	(\$2,522,891)	(\$8,474,583)
5. Total Market Value of Assets Available for Benefits	\$33,911,571	\$28,348,072

Table 7
Reconciliation of Plan Net Assets

Assets at Market Value		
Item	FYE 2019	FYE 2018
A. Market Value of Assets at Beginning of Year	\$28,348,072	\$29,299,924
B. Contribution Income:		
1. Contributions		
a. Employee	\$674,477	\$610,818
b. Employer	1,060,445	960,440
c. Other	353,894	38
d. Total	\$2,088,816	\$1,571,296
2. Investment Income		
a. Interest, dividends, and other income	\$519,128	\$509,757
b. Net appreciation	4,904,270	(1,343,427)
c. Investment expenses	(204,053)	(211,405)
d. Net investment income	\$5,219,345	(\$1,045,075)
3. Securities Lending		
a. Gross income	49,901	\$45,210
b. Deductions	(45,098)	(38,779)
c. Net investment income	\$4,803	\$6,431
4. Benefits and Refunds		
a. Refunds	\$0	\$0
b. Regular monthly benefits	(1,720,417)	(1,454,953)
c. Total	(\$1,720,417)	(\$1,454,953)
5. Administrative and Miscellaneous Expenses	(\$29,048)	(\$29,551)
C. Market Value of Assets at End of Year	\$33,911,571	\$28,348,072

Table 8
Progress of Fund Through December 31, 2019

Plan Year Ending December 31	Employer Contributions*	Employee Contributions*	Administrative Expenses	Net Investment Income**	Benefit Payments	Transfers	Actuarial Value of Assets
Total	\$ 20,258,243	\$ 8,524,393	\$ (223,510)	\$ 16,681,668	\$ (12,722,999)	\$ -	
1998	-	-	-	-	-	-	\$69,339
1999	\$70,511	\$41,294	(\$46)	\$4,527	(\$48,428)	-	137,197
2000	1,403,023	170,858	(106)	52,516	(74,665)	-	1,688,823
2001	307,576	-	(484)	74,536	(184,433)	-	1,886,018
2002	1,290,324	216,131	(3,246)	63,349	(206,260)	-	3,244,316
2003	151,661	274,149	(927)	182,283	(214,508)	-	3,636,994
2004	1,259,619	273,016	(1,166)	316,906	(297,375)	-	5,187,994
2005	241,273	306,642	(1,910)	432,813	(283,480)	-	5,883,332
2006	4,662,777	326,237	(1,681)	799,836	(315,032)	-	11,355,469
2007	370,372	363,692	(7,127)	1,136,494	(391,685)	-	12,827,215
2008	1,308,816	396,872	(10,490)	(1,693,118)	(484,882)	-	12,344,413
2009	644,302	408,953	(4,821)	2,072,540	(573,483)	-	14,891,904
2010	663,375	421,815	(5,762)	560,518	(624,150)	-	15,907,700
2011	674,598	428,952	(9,217)	356,446	(610,572)	-	16,747,907
2012	610,039	344,893	(13,779)	569,056	(708,756)	-	17,549,360
2013	866,286	550,963	(17,037)	1,985,989	(674,750)	-	20,260,811
2014	916,598	582,831	(17,361)	1,761,194	(775,805)	-	22,728,268
2015	920,867	585,545	(18,905)	1,349,705	(931,621)	-	24,633,859
2016	925,971	588,791	(23,218)	1,629,126	(981,321)	-	26,773,208
2017	949,300	603,602	(27,628)	1,930,721	(1,166,423)	-	29,062,780
2018	960,478	610,818	(29,551)	1,191,643	(1,454,953)	-	30,341,215
2019	1,060,477	1,028,339	(29,048)	1,904,588	(1,720,417)	-	32,585,154

* Employer contributions include other funding sources and employee contributions may include member service purchase contributions

** Net of investment expenses

Table 9
Development of Actuarial Value of Assets

Item	FYE 2019	FYE 2018
1. Actuarial value of assets, beginning of year (without corridor)	\$30,341,215	\$29,062,780
2. Market value, end of year	\$33,911,571	\$28,348,072
3. Market value, beginning of year	\$28,348,072	\$29,299,924
4. Non-investment/administrative net cash flow:		
a. Employee contributions	\$674,477	\$610,818
b. Employer contributions	1,060,445	960,440
c. Other contributions	353,894	38
d. Refund of employee accounts	-	-
e. Retirement benefits	(1,720,417)	(1,454,953)
f. Administrative expenses	(29,048)	(29,551)
g. Total net cash flow: [sum of (4a) through (4f)]	\$339,351	\$86,792
5. Investments and securities lending:		
a. Interest and dividends on investments	\$519,128	\$509,757
b. Gross income from securities lending	49,901	45,210
c. Fees and expenses	(249,151)	(250,184)
d. Total net income: [sum of (5a) through (5c)]	\$319,878	\$304,783
6. Investment income:		
a. Actual market return: (2) - (3) - (4g) - (5d)	\$4,904,270	(\$1,343,427)
b. Assumed rate of return	7.00%	7.00%
c. Assumed amount of return	1,676,163	1,749,198
d. Amount subject to phase-in: (6a) - (6c)	\$3,228,107	(\$3,092,625)
7. Phase-in recognition of investment income:		
a. Current year: 0.20 * (6d)	\$645,621	(\$618,525)
b. First prior year	(618,525)	313,607
c. Second prior year	313,607	(27,709)
d. Third prior year	(27,709)	(404,447)
e. Fourth prior year	(404,447)	(125,264)
f. Total recognition	(\$91,453)	(\$862,338)
8. Actuarial value of assets, end of year		
a. Preliminary actuarial value of assets, end of year: (1) + (4g) + (5d) + (6c) + (7f)	\$32,585,154	\$30,341,215
b. Upper corridor limit: 120% * (2)	40,693,885	34,017,686
c. Lower corridor limit: 80% * (2)	27,129,257	22,678,458
d. Actuarial value of assets, end of year	\$32,585,154	\$30,341,215
9. Difference between market and actuarial value of assets	\$1,326,417	(\$1,993,143)
10. Actuarial rate of return	6.24%	4.09%
11. Market rate of return*	18.72%	-3.52%
12. Ratio of actuarial value to market value of assets	96.09%	107.03%

* Current year market rate of return is based on unaudited data and is supplied by the plan's investment

Table 10

History of Investment Returns

Plan Year (1)	Market (2)	Actuarial (3)
2000	-0.99%	5.92%
2001	-4.47%	4.26%
2002	-9.29%	2.42%
2003	21.00%	5.44%
2004	11.54%	7.45%
2005	8.22%	8.14%
2006	12.63%	9.73%
2007	7.44%	9.86%
2008	-29.63%	-12.60%
2009	23.72%	16.47%
2010	13.80%	3.71%
2011	-0.90%	2.21%
2012	14.05%	3.37%
2013	13.53%	11.09%
2014	4.70%	8.54%
2015	-0.26%	5.87%
2016	7.60%	6.55%
2017	14.20%	7.16%
2018	-3.52%	4.09%
2019	18.72%	6.24%

Average returns:

Last five years:	7.02%	5.89%
Last ten years:	7.94%	5.81%

The market returns above are gross of investment expenses and were provided by the plan's investment consultant. The actuarial returns above are based on the financial information provided by the plan's auditors.

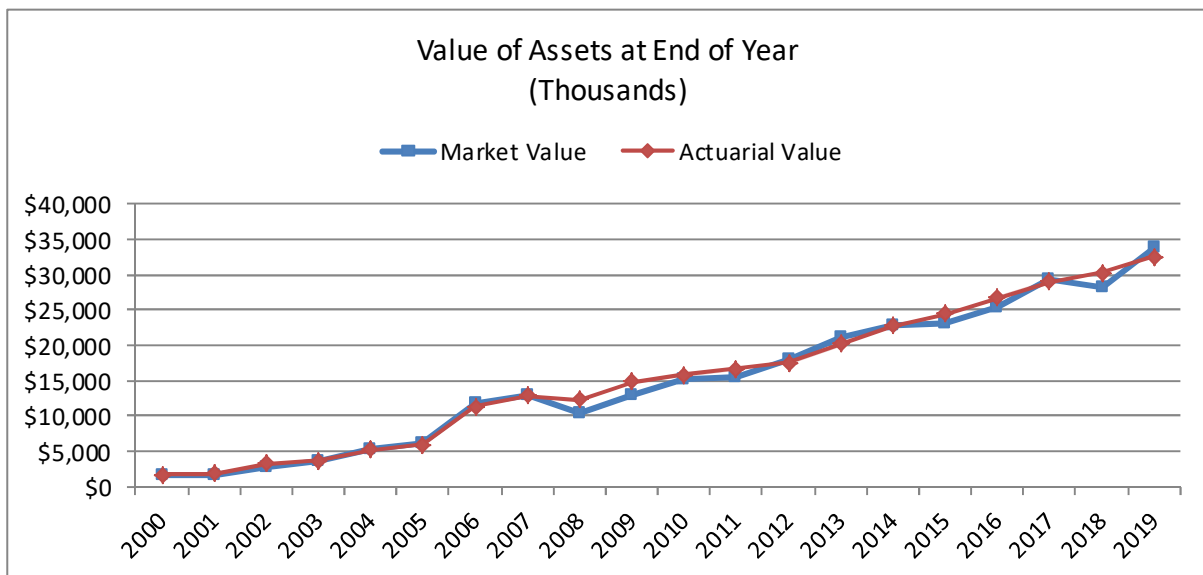


Table 11
Solvency Test

Valuation Date January 1	Total Active Member Contributions (1)	Inactive and Pensioner Liability (2)	Employer Financed Active Accrued Liability (3)	Actuarial Value of Assets	Percentage of Liabilities Covered by Assets		
					(1)	(2)	(3)
2005	\$1,315,893	\$3,204,400	\$4,305,907	\$5,187,994	100%	100%	15.5%
2006	1,704,433	3,106,000	4,666,267	5,883,332	100%	100%	23.0%
2007	1,948,045	4,270,900	4,724,055	11,355,469	100%	100%	100.0%
2008	2,503,079	4,225,100	5,793,021	12,827,215	100%	100%	100.0%
2009	2,835,546	4,818,490	4,540,264	12,344,413	100%	100%	100.0%
2010	3,296,295	5,454,014	5,016,719	14,891,904	100%	100%	100.0%
2011	3,759,606	5,539,108	5,357,937	15,907,700	100%	100%	100.0%
2012	4,309,632	5,519,507	5,828,708	16,747,907	100%	100%	100.0%
2013	4,845,995	5,300,102	6,779,122	17,549,360	100%	100%	100.0%
2014	5,202,705	6,681,945	7,779,758	20,260,811	100%	100%	100.0%
2015	5,799,958	7,658,928	7,784,114	22,728,268	100%	100%	100.0%
2016	6,234,876	9,045,880	7,723,803	24,633,859	100%	100%	100.0%
2017	7,018,765	8,859,774	8,580,794	26,773,208	100%	100%	100.0%
2018	6,833,476	12,686,290	9,567,325	29,062,780	100%	100%	99.7%
2019	6,491,023	15,689,181	8,887,729	30,341,215	100%	100%	91.8%
2020	6,722,132	18,452,449	9,096,040	32,585,154	100%	100%	81.5%

Effective January 1, 2010, liabilities are calculated assuming no future cost-of-living increases.

Table 12
Schedule of Funding Progress

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Valuation Date January 1	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Unfunded AAL (UAAL) [(3) - (2)]	Funded Ratio [(2)/(3)]	Covered Payroll	UAAL as a Percentage of Covered Payroll [(4)/(6)]
2001	\$1,688,823	\$5,451,300	\$3,762,477	30.98%	\$1,992,400	188.84%
2002	1,886,018	6,479,300	4,593,282	29.11%	2,349,900	195.47%
2003	3,244,316	6,575,100	3,330,784	49.34%	2,363,000	140.96%
2004	3,636,994	8,371,700	4,734,706	43.44%	3,066,500	154.40%
2005	5,187,994	8,826,200	3,638,206	58.78%	3,059,900	118.90%
2006	5,883,332	9,775,300	3,891,968	60.19%	3,493,900	111.39%
2007	11,355,469	11,091,300	(264,169)	102.38%	3,591,300	-7.36%
2008	12,827,215	12,725,300	(101,915)	100.80%	4,122,100	-2.47%
2009	12,344,413	15,401,500	3,057,087	80.15%	4,401,600	69.45%
2010	14,891,904	13,767,028	(1,124,876)	108.17%	4,664,111	-24.12%
2011	15,907,700	14,656,651	(1,251,049)	108.54%	4,866,692	-25.71%
2012	16,747,907	15,657,847	(1,090,060)	106.96%	4,861,758	-22.42%
2013	17,549,360	16,925,219	(624,141)	103.69%	5,410,651	-11.54%
2014	20,260,811	19,664,408	(596,403)	103.03%	6,213,775	-9.60%
2015	22,728,268	21,243,000	(1,485,268)	106.99%	6,601,641	-22.50%
2016	24,633,859	23,004,559	(1,629,300)	107.08%	6,624,052	-24.60%
2017	26,773,208	24,459,333	(2,313,875)	109.46%	6,625,476	-34.92%
2018	29,062,780	29,087,091	24,311	99.92%	6,820,351	0.36%
2019	30,341,215	31,067,933	726,718	97.66%	6,866,395	10.58%
2020	32,585,154	34,270,621	1,685,467	95.08%	7,706,958	21.87%

Effective January 1, 2010, liabilities are calculated assuming no future cost-of-living increases.

Table 13

Schedule of Contributions from the Employer(s) and Other Contributing Entities

(1)	(2)	(3)	(4)	(5)	(6)
Fiscal Year Ending December 31	Actuarially Determined Contribution		Employer Contributions		Percentage of Actuarially Determined Contribution Contributed [(5)/(3)]
	% of Payroll	Amount	% of Payroll	Amount	
2004	8.75%	\$268,300	41.08%	\$1,259,619	469.48%
2005	9.03%	276,300	7.88%	241,273	87.32%
2006	8.78%	306,600	133.45%	4,662,777	1520.80%
2007	8.78%	315,200	10.31%	370,372	117.50%
2008	8.78%	362,100	31.75%	1,308,816	361.45%
2009	14.50%	638,400	14.64%	644,302	100.92%
2010	8.78%	409,105	14.22%	663,375	162.15%
2011	8.40%	409,031	13.86%	674,598	164.93%
2012	8.69%	422,266	12.55%	610,039	144.47%
2013	9.42%	509,643	16.01%	866,286	169.98%
2014	9.60%	596,723	14.75%	916,598	153.61%
2015	8.93%	589,177	13.95%	920,867	156.30%
2016	8.75%	579,926	13.98%	925,971	159.67%
2017	8.20%	543,468	14.33%	949,300	174.67%
2018	13.34%	909,557	14.50%	960,478	105.60%
2019	14.37%	986,724	16.01%	1,060,477	107.47%
2020	15.26%	1,176,110	-	-	-

Effective January 1, 2010, liabilities are calculated assuming no future cost-of-living increases.

Table 14
Reconciliation of Participant Data

	Active Participants	Vested Former Participants	Retired Participants	Disabled	Beneficiaries	Participants Due Refunds	Total
Number as of January 1, 2019	47	-	22	-	4	-	73
New participants	7	-	-	-	-	-	7
Vested terminations	-	-	-	-	-	-	-
Retirements	(4)	-	4	-	-	-	-
Disability	-	-	-	-	-	-	-
Deceased with beneficiary	-	-	-	-	-	-	-
Deceased without beneficiary	-	-	-	-	-	-	-
Due refunds	-	-	-	-	-	-	-
Lump sum payoffs	-	-	-	-	-	-	-
Rehires/return to active	-	-	-	-	-	-	-
Certain period expired	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-
Data corrections	-	-	-	-	-	-	-
Number as of January 1, 2020	50	-	26	-	4	-	80

Table 15
Demographic Statistics

	January 1		
	2020	2019	Change
<u>Active Participants</u>			
Number	50	47	6.4%
<i>Vested</i>	34	37	
<i>Not vested</i>	16	10	
Average age (years)	57.00	57.86	-1.5%
Average service (years)	8.69	9.37	-7.3%
Average entry age (years)	48.31	48.49	-0.4%
Total payroll*	\$7,706,958	\$6,866,395	12.2%
Average payroll*	\$154,139	\$146,094	5.5%
Total employee contributions with interest	\$6,722,132	\$6,491,023	3.6%
Average employee contributions with interest	\$134,443	\$138,107	-2.7%
<u>Vested Former Participants</u>			
Number	0	0	0.0%
Average age (years)	0.00	0.00	
Total employee contributions with interest	\$0	\$0	
Average employee contributions with interest	N/A	N/A	
<u>Service Retirees</u>			
Number	26	22	18.2%
Average age (years)	73.2	73.3	-0.1%
Total annual benefits	\$1,743,139	\$1,463,440	19.1%
Average annual benefit	\$67,044	\$66,520	0.8%
<u>Disability Retirees</u>			
Number	0	0	0.0%
Average age (years)	0.0	0.0	
Total annual benefits	\$0	\$0	
Average annual benefit	N/A	N/A	
<u>Beneficiaries</u>			
Number	4	4	0.0%
Average age (years)	77.9	76.9	1.3%
Total annual benefits	\$122,696	\$122,696	0.0%
Average annual benefit	\$30,674	\$30,674	0.0%
Participants Due Refunds	0	0	0.0%

* Projected payroll for the upcoming valuation year

Table 16

Distribution of Male Active Members by Age and by Years of Service

Average Age = 59.2 Average Service = 9.9

Age Last Birthday		Whole Years of Service at Valuation Date							Totals
		0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
Less than 20	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
20-24	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
25-29	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
30-34	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
35-39	Count	1	-	-	-	-	-	-	1
	Avg. Salary	*	-	-	-	-	-	-	*
40-44	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
45-49	Count	2	1	1	-	-	-	-	4
	Avg. Salary	*	*	*	-	-	-	-	\$155,536
50-54	Count	1	4	-	-	-	-	-	5
	Avg. Salary	*	\$139,661	-	-	-	-	-	142,628
55-59	Count	3	-	1	-	-	-	-	4
	Avg. Salary	*	-	*	-	-	-	-	146,089
60-64	Count	2	4	5	1	1	-	-	13
	Avg. Salary	*	144,605	\$142,628	*	*	-	-	142,349
65-69	Count	-	1	1	4	1	1	-	8
	Avg. Salary	-	*	*	\$149,550	*	*	-	153,292
70 & Over	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
Totals	Count	9	10	8	5	2	1	-	35
	Avg. Salary	\$147,807	\$142,628	\$148,949	\$146,583	*	*	-	\$146,849

Average Salary represents annualized salary earned in 2019 and is not shown for cells with counts less than or equal to three participants.

Table 17

Distribution of Female Active Members by Age and by Years of Service

Average Age = 52.0 Average Service = 5.8

Age Last Birthday		Whole Years of Service at Valuation Date							Totals
		0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
Less than 20	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
20-24	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
25-29	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
30-34	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
35-39	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
40-44	Count	3	-	-	-	-	-	-	3
	Avg. Salary	*	-	-	-	-	-	-	*
45-49	Count	2	1	-	-	-	-	-	3
	Avg. Salary	*	*	-	-	-	-	-	*
50-54	Count	1	2	1	-	-	-	-	4
	Avg. Salary	*	*	*	-	-	-	-	\$149,695
55-59	Count	2	-	-	-	-	-	-	2
	Avg. Salary	*	-	-	-	-	-	-	*
60-64	Count	-	1	1	-	1	-	-	3
	Avg. Salary	-	*	*	-	*	-	-	*
65-69	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
70 & Over	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
Totals	Count	8	4	2	-	1	-	-	15
	Avg. Salary	\$156,687	\$148,348	*	-	*	-	-	\$151,388

Average Salary represents annualized salary earned in 2019 and is not shown for cells with counts less than or equal to three participants.

Table 18

Distribution of Total Active Members by Age and by Years of Service

Average Age = 57.0 Average Service = 8.7

Age Last Birthday		Whole Years of Service at Valuation Date							Totals
		0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
Less than 20	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
20-24	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
25-29	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
30-34	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
35-39	Count	1	-	-	-	-	-	-	1
	Avg. Salary	*	-	-	-	-	-	-	*
40-44	Count	3	-	-	-	-	-	-	3
	Avg. Salary	*	-	-	-	-	-	-	*
45-49	Count	4	2	1	-	-	-	-	7
	Avg. Salary	\$150,592	*	*	-	-	-	-	\$149,439
50-54	Count	2	6	1	-	-	-	-	9
	Avg. Salary	*	\$141,309	*	-	-	-	-	145,769
55-59	Count	5	-	1	-	-	-	-	6
	Avg. Salary	153,757	-	*	-	-	-	-	153,880
60-64	Count	2	5	6	1	2	-	-	16
	Avg. Salary	*	149,577	\$141,309	*	*	-	-	143,089
65-69	Count	-	1	1	4	1	1	-	8
	Avg. Salary	-	*	*	\$149,550	*	*	-	153,292
70 & Over	Count	-	-	-	-	-	-	-	-
	Avg. Salary	-	-	-	-	-	-	-	-
Totals	Count	17	14	10	5	3	1	-	50
	Avg. Salary	\$151,986	\$144,262	\$148,080	\$146,583	*	*	-	\$148,211

Average Salary represents annualized salary earned in 2019 and is not shown for cells with counts less than or equal to three participants.

Table 19
Schedule of Pension Recipients Added to and Removed from Rolls

Fiscal Year Ending December 31	Added to Rolls*		Removed from Rolls		Total		Percent Increase in Annual Pension Benefits	Average Annual Pension Benefit
	Count	Annual Pension Benefits	Count	Annual Pension Benefits	Count	Annual Pension Benefits		
2008	2	\$137,212	0	(\$11,043)	9	\$544,096	37.45%	\$60,455
2009	1	72,878	0	0	10	616,974	13.39%	61,697
2010	3	127,495	2	133,897	11	610,572	-1.04%	55,507
2011	0	0	0	0	11	610,572	0.00%	55,507
2012	0	0	0	0	11	610,572	0.00%	55,507
2013	2	113,010	0	0	13	723,582	18.51%	55,660
2014	3	107,248	0	0	16	830,830	14.82%	51,927
2015	2	150,491	0	0	18	981,321	18.11%	54,518
2016	0	0	0	0	18	981,321	0.00%	54,518
2017	4	307,625	0	0	22	1,288,946	31.35%	58,588
2018	5	364,563	1	67,372	26	1,586,136	23.06%	61,005
2019	4	279,699	0	0	30	1,865,835	17.63%	62,195

* Includes cost-of-living increases

Table 20
Pensioners by Age

Average Age Male = 74.1 Average Age Female = 73.3 Average Age Total = 73.8

Age Last Birthday	Males	Females	Total
Under 50	0	0	0
50-54	0	0	0
55-59	0	0	0
60-64	0	1	1
65-69	8	3	11
70-74	4	3	7
75-79	2	1	3
80-84	4	1	5
85 & over	2	1	3
Total	20	10	30

Table 21
Pensions Awarded in 2019

Average Age = 66.9

Males & Females	
Benefit Amount	Total
Under \$200	0
\$200-\$399	0
\$400-\$599	0
\$600-\$799	0
\$800-\$999	0
\$1,000-\$1,499	0
\$1,500-\$1,999	0
\$2,000-\$2,499	0
\$2,500 & over	4
Total	4
Males & Females	
Age Last Birthday	Total
Under 50	0
50-54	0
55-59	0
60-64	0
65-69	4
70-74	0
75-79	0
80-84	0
85 & over	0
Total	4

Table 22

Retirees and Disabled Members by Service at Retirement and Years Since Retirement

Average Service at Retirement = 16.9 Average Years Since Retirement = 6.6

Service at Retirement		Years Elapsed Since Retirement							Totals
		0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
Less than 5	Count	-	-	-	-	-	-	-	-
	Avg. Benefit	-	-	-	-	-	-	-	-
5-9	Count	-	1	-	-	-	-	-	1
	Avg. Benefit	-	\$3,783	-	-	-	-	-	\$3,783
10-14	Count	3	2	1	-	-	-	-	6
	Avg. Benefit	\$4,297	2,951	\$3,014	-	-	-	-	3,635
15-19	Count	9	1	1	1	-	-	-	12
	Avg. Benefit	7,003	5,046	4,934	\$4,658	-	-	-	6,472
20-24	Count	1	1	2	2	-	-	-	6
	Avg. Benefit	7,526	6,831	5,779	5,071	-	-	-	6,010
25-29	Count	-	-	1	-	-	-	-	1
	Avg. Benefit	-	-	5,950	-	-	-	-	5,950
30-34	Count	-	-	-	-	-	-	-	-
	Avg. Benefit	-	-	-	-	-	-	-	-
35 & Over	Count	-	-	-	-	-	-	-	-
	Avg. Benefit	-	-	-	-	-	-	-	-
Totals	Count	13	5	5	3	-	-	-	26
	Avg. Benefit	\$6,419	\$4,312	\$5,091	\$4,934	-	-	-	\$5,587

Table 23

Retirees and Disableds by Year of Retirement

January 1, 2020 Total = 26

Year of Retirement	Count
Under 2000	0
2000	1
2001	1
2002	0
2003	0
2004	1
2005	0
2006	1
2007	1
2008	2
2009	1
2010	1
2011	0
2012	0
2013	2
2014	2
2015	1
2016	0
2017	4
2018	4
2019*	4

**May include retirements as of January 1, 2020*

Table 24
Thirty Year Projected Benefit Payments

Year Ending December 31	Actives	Retirees*	Total
2020	\$ 75,770	\$ 1,852,875	\$ 1,928,644
2021	207,415	1,825,008	2,032,423
2022	379,677	1,794,964	2,174,641
2023	561,446	1,762,691	2,324,137
2024	817,862	1,728,150	2,546,012
2025	1,081,324	1,691,317	2,772,640
2026	1,310,111	1,652,176	2,962,288
2027	1,600,400	1,610,727	3,211,127
2028	1,832,185	1,566,979	3,399,163
2029	2,022,524	1,520,947	3,543,470
2030	2,224,090	1,472,655	3,696,745
2031	2,459,419	1,422,141	3,881,560
2032	2,678,855	1,369,464	4,048,319
2033	2,807,830	1,314,695	4,122,525
2034	2,944,677	1,257,905	4,202,582
2035	3,101,541	1,199,148	4,300,690
2036	3,208,192	1,138,493	4,346,685
2037	3,362,658	1,076,041	4,438,700
2038	3,501,844	1,011,940	4,513,784
2039	3,595,535	946,394	4,541,929
2040	3,776,068	879,690	4,655,759
2041	4,014,683	812,206	4,826,889
2042	4,187,991	744,426	4,932,417
2043	4,268,966	676,934	4,945,900
2044	4,334,344	610,366	4,944,710
2045	4,351,844	545,405	4,897,249
2046	4,459,405	482,753	4,942,158
2047	4,544,300	423,080	4,967,380
2048	4,533,000	366,991	4,899,991
2049	4,533,959	314,982	4,848,941

* Includes Disabled Members, Beneficiaries, and Deferred Vested Members. Retirement benefit payments for deferred vested members are assumed to commence at age 65.

APPENDIX A

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

Summary of Actuarial Assumptions and Methods

The following methods and assumptions were used in preparing the January 1, 2020 actuarial valuation report.

1. Valuation Date

The valuation date for any given year is January 1st, the first day of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

2. Actuarial Cost Method

The actuarial valuation uses the Entry Age Normal (EAN) actuarial cost method, amortized as a level percentage of payroll. Under this method, the employer contribution rate is the sum of (i) the employer normal cost rate, and (ii) the rate that will amortize the unfunded actuarial accrued liability (UAAL).

- a. The valuation is prepared on the projected benefit basis, under which the present value, at the investment return rate assumed to be earned in the future (currently 7.00%), of each participant's expected benefit payable at retirement or death is determined, based on his/her age, service, sex and compensation. The calculations take into account the probability of a participant's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his/her terminating with a service, disability, or survivor's benefit. Future salary increases are also anticipated. The present value of the expected benefits payable for the active participants is added to the present value of the expected future payments to retired participants and beneficiaries to obtain the present value of all expected benefits payable from the Fund on account of the present group of participants and beneficiaries.
- b. The employer contributions required to support the benefits of the Fund are determined using a level funding approach, and consist of a normal cost contribution and a unfunded accrued liability contribution.
- c. The normal cost contribution is determined using the "entry age normal" actuarial cost method. Under this method, a calculation is made to determine the average uniform and constant percentage rate of employer contribution which, if applied to the compensation of each new participant during the entire period of his/her anticipated covered service, would be required to meet the cost of all benefits payable on his/her behalf based on the benefits provisions applicable for the individual member.
- d. The unfunded actuarial accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability and amortizing the result over 15 years from the valuation date. The Board's policy consists of amortizing the unfunded liability as of January 1, 2018, over a closed 15 year period with each subsequent amortization base created as a result of year to year experience changes over individual 15 year closed periods. The current year amortization base is determined by taking the current unfunded liability less the outstanding amounts of prior year bases.



Summary of Actuarial Assumptions and Methods (continued)

3. Actuarial Value of Assets

The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (less than) expected investment income, with interest, dividends, and other income recognized immediately. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of administrative and investment expenses. An adjustment is made if the actuarial value is not within 20% of the Market Value. For any year following a year in which the 20% of market value adjustment was applied, the actuarial value is determined as if the adjustment was not applied in the previous year.

4. Economic Assumptions

a. Investment return

7.00% per year, compounded annually, composed of an assumed 2.25% inflation rate and a 4.75% net real rate of return. This rate represents the assumed return, net of investment expenses.

b. Salary increase rate

4.00% per annum

c. Payroll growth rate

In the amortization of the unfunded actuarial accrued liability, payroll is assumed to increase 4.00% per year. This increase rate is solely due to the effect of inflation on salaries, with no allowance for future membership growth.

d. Cost-of-Living adjustment

No cost-of-living adjustment is assumed since the policy for providing the benefit requires Board approval to make the recommendation to the Joint Appropriations Committee and the funded level of the plan shows a cost-of-living requirement would not be permitted.

Summary of Actuarial Assumptions and Methods (continued)

5. Demographic Assumptions

a. Mortality

Healthy Pre-Retirement Mortality:

RP-2014 Employee Mortality Table, fully generational, projected with Scale MP-2017

Males: No set back with a multiplier of 100%

Females: No set back with a multiplier of 100%

Healthy Post-Retirement Mortality:

RP-2014 Healthy Annuitant Table, fully generational, projected with Scale MP-2017

Males: No set back with a multiplier of 100%

Females: No set back with a multiplier of 88%

Disabled Mortality

RP-2014 Disabled Mortality Table, fully generational, projected with Scale MP-2017

Males: No set back with a multiplier of 100%

Females: No set back with a multiplier of 100%

Age	Pre-Retirement		Post-Retirement		Disabled	
	Projected to 2020 using Scale MP-2017					
	Male	Female	Male	Female	Male	Female
20	0.04%	0.02%	0.04%	0.01%	0.04%	0.02%
25	0.05%	0.02%	0.06%	0.03%	0.20%	0.09%
30	0.05%	0.02%	0.09%	0.06%	0.50%	0.24%
35	0.06%	0.03%	0.13%	0.10%	0.92%	0.45%
40	0.07%	0.04%	0.19%	0.14%	1.32%	0.68%
45	0.09%	0.06%	0.27%	0.18%	1.63%	0.90%
50	0.16%	0.11%	0.38%	0.23%	1.90%	1.14%
55	0.27%	0.17%	0.55%	0.32%	2.24%	1.44%
60	0.47%	0.25%	0.78%	0.47%	2.65%	1.73%
65	0.83%	0.36%	1.10%	0.70%	3.17%	2.05%
70	1.34%	0.60%	1.62%	1.07%	3.91%	2.67%
75			2.54%	1.74%	5.14%	3.87%
80			4.23%	2.93%	7.24%	5.83%
85			7.37%	5.14%	10.78%	8.73%
90			13.01%	9.14%	16.56%	12.86%
95			20.87%	15.23%	23.60%	18.94%
100			30.32%	23.24%	31.55%	27.12%

Summary of Actuarial Assumptions and Methods (continued)

b. Disability and Withdrawal

Age	Disability		Withdrawal	
	Ultimate		Male	Female
Male	Female	Male	Female	
20	0.01%	0.01%	5.60%	5.60%
25	0.01%	0.01%	4.20%	4.20%
30	0.01%	0.01%	2.90%	2.90%
35	0.01%	0.01%	2.00%	2.00%
40	0.01%	0.01%	1.50%	1.50%
45	0.01%	0.01%	1.10%	1.10%
50	0.03%	0.03%	0.80%	0.80%
55	0.05%	0.05%	0.60%	0.60%
60	0.07%	0.07%	0.40%	0.40%

c. Retirement Rates

Age	Rate	Age	Rate
55	2%	64	2%
56	2%	65	15%
57	2%	66	10%
58	2%	67	10%
59	2%	68	10%
60	2%	69	10%
61	2%	70	15%
62	2%	71	15%
63	2%	72	100%

Summary of Actuarial Assumptions and Methods (continued)

6. Other Assumptions

- a. Percent married: 85.00% of employees are assumed to be married. (No beneficiaries other than the spouse assumed.)
- b. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.
- c. Percent electing annuity on death (when eligible): All of the spouses of vested, married participants are assumed to elect an annuity.
- d. Percent electing deferred termination benefit: Vested terminating members are assumed to elect a refund or a deferred benefit, whichever is more valuable at the time of termination.
- e. Assumed age for commencement of deferred benefits: Members electing to receive a deferred benefit are assumed to commence receipt at the first age at which unreduced benefits are available, which for this plan is age 65.
- f. No benefit amount data is available for members entitled to deferred benefits. The benefit is estimated using the final average compensation and service provided by WRS.
- g. There will be no recoveries once disabled.
- h. No surviving spouse will remarry.
- i. Administrative expenses: Average of actual expenses for the prior two years, with each year projected at 2.50% to the valuation date.
- j. Pay increase timing: Beginning of (fiscal) year. This is equivalent to assuming that reported pay represents amount paid to members during the year ended on the valuation date.
- k. Decrement timing: Decrements of all types are assumed to occur mid-year.
- l. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
- m. Decrement relativity: Decrement rates are converted to probabilities in order to account for multiple decrements.
- n. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in the report, and the actual payroll payable at the time contributions are made.
- o. Benefit Service: All members are assumed to accrue one year of service each year.

APPENDIX B

SUMMARY OF PLAN PROVISIONS

Summary of Plan Provisions

Covered Members	Any justice of the supreme court, district judge appointed or circuit court judge appointed to any of those offices on or after July 1, 1998, or who elects to participate in the judicial retirement program under this act in accordance with W.S. 9-3-713.
Final Average Salary	Employee's average annual salary for the highest paid three continuous years of service.
Form of Payment	Monthly benefit for life. Upon death, 50% of the benefit continues to be paid to the beneficiary.
Service Retirement	
Eligibility	Age 70 with continuous service from appointment, age 65 with four or more years of service, or age 60 with 20 or more years of service.
Monthly Benefit	Highest Average Salary times the sum of the following: <ul style="list-style-type: none">a) 4% for each of the first five years of service,b) 3% for each year from and including the sixth year through the fifteenth year of service,c) 2% for each year from and including the sixteenth year through the twentieth year of service,d) 1% for each year thereafter.
Vesting	Any employee who has left employment with four or more years of service, and who has not withdrawn accumulated contributions, is eligible to receive the above benefit or can elect to receive a lump-sum refund of contributions with interest. An employee who terminates with less than four years of service and has not served continuously from the date of appointment to the age of 70 is only eligible for the lump-sum benefit.
Early Retirement	A member who is at least age 55 with four or more years of service may retire with the benefits described above reduced five percent for each year of retirement prior to age 65.
Disability Retirement	
Eligibility	Retirement by reason of permanent disability after completion of at least 10 years of service.
Monthly Benefit	Service retirement benefit determined as of the disability retirement date.

Summary of Plan Provisions (continued)

Pre-Retirement Death

Eligibility	No age or service requirements.
Benefit	A lump sum equal to two times the employee contributions with interest. If the employee is vested, the beneficiary can elect, in lieu of this lump sum, to receive a monthly benefit equal to the actuarial equivalent of the retirement benefit that would be due the employee as if the member had terminated on the date of death.

Contributions

Employee	9.22% of salary.
Employer	14.50% of salary.
Interest	3.00% annually.

Cost-of-Living Improvements

W.S. 9-3-454 prohibits benefit changes, including cost-of-living increases, unless the funded ratio stays above 100% plus a margin for adverse experience throughout the life of the benefit change.

APPENDIX C

RISKS ASSOCIATED WITH MEASURING THE ACCRUED LIABILITY

Risks Associated With Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;
2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. Salary and Payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;
6. Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The computed contribution rate shown on Table 1b may be considered as a minimum contribution rate that complies with the Board's funding policy. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.



Risks Associated With Measuring the Accrued Liability and Actuarially Determined Contribution

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	<u>January 1, 2020</u>	<u>January 1, 2019</u>
Ratio of the market value of assets to total payroll	4.4	4.1
Ratio of actuarial accrued liability to payroll	4.4	4.5
Ratio of actives to retirees and beneficiaries	1.7	1.8
Ratio of net cash flows to market value of assets	1%	0%
Duration of the actuarial accrued liability	10.4	10.4

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 4.0 times the payroll, a return on assets 5% different than assumed would equal 20% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 5.5 times the payroll, a change in liability 2% other than assumed would equal 11% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Risks Associated With Measuring the Accrued Liability and Actuarially Determined Contribution

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Duration of Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability